

Appl. No. 10/708,942
Amdt. dated July 07, 2005
Reply to Office action of May 03, 2005

REMARKS/ARGUMENTS

1. Rejection of claims 10-20 under 35 U.S.C. 112, second paragraph:

Claims 10-20 are rejected under 35 U.S.C. 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention.

Response:

Claims 10-20 have been cancelled and are no longer in need of consideration.

2. Double patenting Rejection of claims 1-20:

Claims 1-20 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting.

Response:

Claims 1-20 have been cancelled and are no longer in need of consideration.

3. Rejection of claims 1-20 under 35 U.S.C. 102(b) and 103(a):

Claims 1-20 are rejected under 35 U.S.C. 102(b) and 103(a) for reasons of record.

Response:

Claims 1-20 have been cancelled and are no longer in need of consideration. In their place, new claims 21-29 are drafted, as will be explained below.

4. Introduction to new claims 21-29:

New claims 21-29 are drafted to more clearly define the present invention and to distinguish from the cited prior art. New independent claims 21 and 26 now claim a lowpass filter formed in a multi-layered substrate. Each recites a first inductor and

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5 a first capacitor electrically connected to a first node and a second inductor and a second capacitor electrically connected to a second node. In addition, a third inductor is electrically connected to both the first node and the second node, and the third inductor is formed on different layers of the multi-layered substrate than the first and second inductors.

10 Claim 26 also specifies that the first and second inductors are formed on a first layer, the third inductor is formed on a second layer, and the first and second capacitors each contain two metal sheets, with one sheet on a third layer and the other sheet on the fourth layer. All claims are supported in the specification and in Fig. 14 of the instant application. No new matter has been added.

15 On the other hand, Uchida et al., Kaneko et al., Phillips, Jr., Tomaru, Lo, Wheeler, Kameya, Johnson, and Smith et al. all do not teach the claimed fifth order lowpass filters formed in multi-layered substrates. Although Smith et al. teaches a side-by-side inductor, Smith only teaches a single inductor formed in multiple layers, and does not teach a lowpass filter in which three inductors and two capacitors are connected at first and second nodes, as is recited in the new claims 21 and 26.

20 Referring back to the circuit shown in Fig. 14 of the instant application, the negative mutual inductances L_{M2} , L_{M4} between adjacent inductors can be thought of as being equivalent to real inductors L_2 , L_4 in series with the capacitors C_2 and C_4 . The series resonance of L_2 , C_2 and L_4 , C_4 will create short-circuit at two different frequencies by letting $L_2 * C_2 \neq L_4 * C_4$. Therefore, the filter frequency response will
25 have two transmission zeros. This will further improve the rejection at the stopband for this lowpass filter compared to Uchida et al., which has only one transmission zero. So the lowpass filter shown in Fig. 13 is not equivalent to the cascade of two of Uchida et. al's filters. In addition, for a higher order filter containing additional

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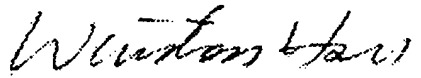
inductor-capacitor pairs, more transmission zeros can be achieved.

Dependent claims 22-25 and 27-29 are fully supported in the specification and in Fig. 14, and should be allowed if new independent claims 21 and 26 are allowed.

- 5 Acceptance of new claims 21-29 is respectfully requested. In view of the above arguments in favor of patentability, the applicant respectfully requests that a timely Notice of Allowance be issued in this case.

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Respectfully submitted,



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- 20 Note: Please leave a message in my voice mail if you need to talk to me. The time in D.C. is 12 hours behind the Taiwan time, i.e. 9 AM in D.C. = 9 PM in Taiwan.